# Board of Education:

## BASIC Stamp "What's a Microcontroller?" Learning Platform

The Board of Education is a BASIC Stamp II (BS2-IC) and BASIC Stamp IISX (BS2SX-IC) learning tool for our Stamps in Class curriculum. The Board of Education has a low price exclusively for the student and educator. For those working alone it's a quick platform for building a circuit, and for an educator it's an easy way to implement your curriculum without providing soldering and wire stripping tools. The Board of Education is a complete, low cost system that is designed to teach entry-level computer integrated electronics.

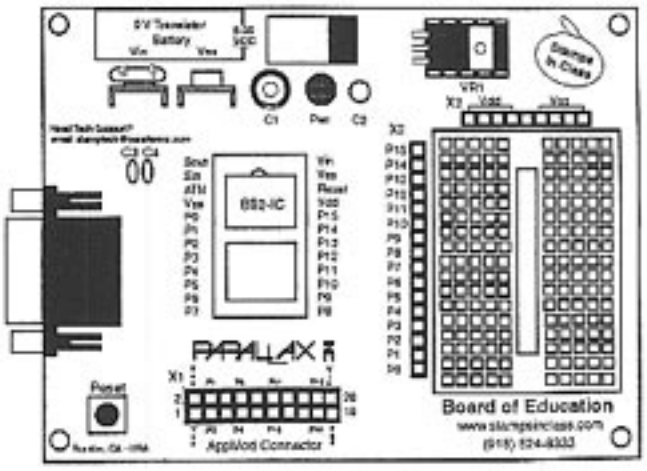
### Packing List

Verify that your Board of Education package is complete using the chart on the right. Educational institutions may request custom kits once teamed with a Stamps in Class representative. This could be initiated by e-mail to stampsinclass@parallaxinc.com.

| Stock # | Name | Board of Education | BS2-IC | Pluggable Wires | Serial Cable | Power Supply | Documentation |
|---|---|---|---|---|---|---|---|
| 28150 | Board of Education | X | | X | | | X |
| 28102 | Board of Education - Full Kit | X | X | X | X | X | X |

### Features

- Wall-pack or 9-volt battery power supply connections (mechanically interlocked to prevent dual connection);
- DB9 connector for BS2-IC programming and serial communication during run-time;
- On-board regulator delivers up to 1 amp of power for larger projects;
- P0 - P15 I/O pins, Vdd and Vss connections brought adjacent to 2" x 1 3/8" breadboard area;
- Includes set of ten (10) color-coded pluggable 22 gauge wires with tinned ends;
- Female 10-pin dual row connector for optional AppMods; and
- Traces on top of the board show connections between BS2-IC module and breadboard sockets.



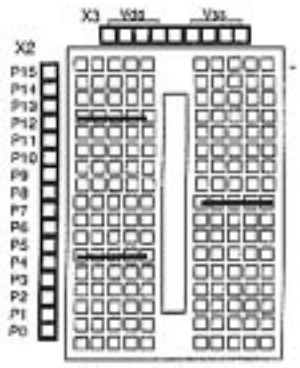

*Board of Education dimensions are 3" x 4"*

## Using the Breadboard

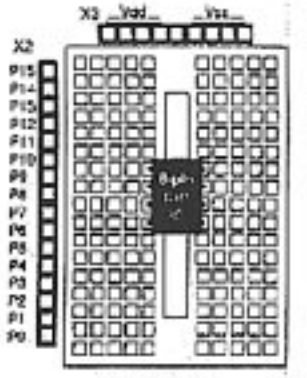
The breadboard has many strips of copper which run underneath the board in a horizontal fashion. These strips connect the sockets to each other. This makes it easy to connect components together to build circuits.

To use the breadboard, the legs of components or wires are placed in the sockets. The sockets are made so that they will hold the component in place. Each hole is connected to one of the metal strips running underneath the board. Each metal strip forms a node. A node is a point in a circuit where two components are connected. Connections between different components are formed by putting their legs in a common node. There are two columns of 17 nodes on the breadboard. Each node contains 5 holes.

For chips with many legs (ICs), place them in the middle of the board so that half of the legs are on the left side and half are on the right side. Nodes on the left side are not connected to the right side.




*Copper strips underneath connect sockets*



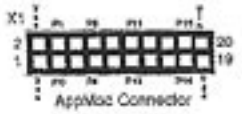

*8-pin DIP IC plugged into breadboard*

## BASIC Stamp II I/O Access, Vdd, and Vss

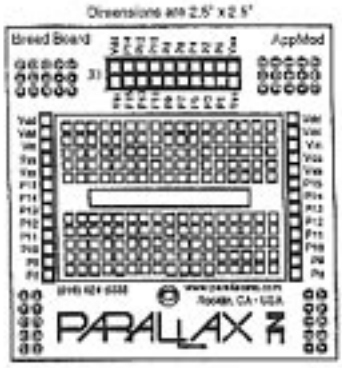
The BS2-IC's 16 I/O pins are brought to the X2 female socket left of the breadboard. I/O pins are accessed by plugging wires into the header, then into the breadboard sockets. The X3 socket provides four connection points for a +5V (Vdd) connection, and ground (Vss). The middle socket in the X3 header serves no purpose.

## AppMod Header

The small AppMod connector is for I/O-oriented projects and additional breadboards made by Parallax. Available AppMods include another breadboard and a prototype board. Projects in the design process include an ISD Digital Recording Studio, and a Four-Digit Seven Segment LED Display Panel. Similar to the breadboard on the Board of Education, the AppMod provides access to all BS2-IC I/O pins, Vss, and Vdd.




*AppMods may be stacked using this I/O bus*




*Example Breadboard AppMod*

## Programming on the Board of Education

The Board of Education includes no electronic components to learn PBASIC programming. However, Parallax has developed six educational lessons using the Board of Education. These lessons are available for download from http://www.stampsinclass.com (all lessons are Adobe *.PDF format) and include:

- Experiment #1: "What's a microcontroller?"
- Experiment #2: "Detecting the Outside World"
- Experiment #3: "Micro-controlled Movement"
- Experiment #4: "Simple Automation"
- Experiment #5: "Making Decisions - Creating an Intelligent Machine"
- Experiment #6: "Serial Data Communications"

Several electronic components are used in these lessons. The component kit is available from Parallax as the " "What's a Microcontroller" Parts Kit" by ordering stock code #28122. In case you want to assemble your own kit the following components are used in these six lessons:

| Component | Qty. | Component | Qty. |
|---|---|---|---|
| 470 ohm 1/4W 5% resistor | 6 | 1K 1/4W 5% RESISTOR | 5 |
| LED – red, diffused | 6 | Photo Resistor | 1 |
| 10K 1/4W 5% resistor | 2 | 555 timer (8 pin dip) | 1 |
| Tact switch (pushbutton) | 2 | 1uF electrolytic capacitor | 1 |
| Jumper wires, bag of 10 | 1 | 10 uF electrolytic cap | 1 |
| DC hobby servo | 1 | 15k 1/4 W 5% resistor | 1 |
| 3000 uF electrolytic capacitor | 1 | 100k pot | 1 |
| 3 pin single row header | 1 | 100k solid state potentiometer | 1 |